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Chapter 9

Interventions for Failed Family Planning

Li-Wei Chien and Heng-Kien Au

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Abstract

Despite the introduction of family planning services in most areas of the world, failures of contraceptive use often lead to unplanned pregnancies. These women often resort to unsafe methods to end their pregnancies, which contributes to the fourth leading cause of maternal mortality worldwide. Demographic variables that may affect the intention to discontinue the pregnancies would be demonstrated. Pros and cons of different types of induced abortions would be presented and discussed. Programs integrating counseling for women after failed family planning for future comprehensive reproductive health care will be shown. The gap between women's reproductive desire to avoid pregnancy and altitude of contraceptive use may contribute to the prevalence of unintended pregnancy. Age, race/ethnicity, marital status, and socioeconomic characteristics should be considered in counseling women after failed family planning. Expanding the program that offers integrated abortion training would prepare more physicians to provide comprehensive care for family planning.

Keywords: unintended pregnancy, induced abortion, use of contraception

1. Introduction

It was estimated that 7.9% (95% UI 4.7–13.2) of all maternal deaths were due to abortion by a global systemic analysis conducted by the World Health Organization (WHO) [1]. Although it is lower than that by the previous report, i.e., up to 13% [2], abortion-related deaths remain the fourth leading cause of maternal mortality after hemorrhage, hypertensive disorders, and sepsis (**Table 1**). Moreover, as deaths consequent to unsafe abortion have decreased in recent years, the focus is shifting toward adverse outcomes associated with abortion [3]. It is estimated that 7 million women were treated for complications from unsafe pregnancy termination in 2012 [4]. It is imperative that patients and families have access to the full spectrum of reproductive care options, including contraception method, pregnancy termination, and

	Abortion		Embolism		Hemorrhage		Hypertension		Sepsis		Other direct causes		Indirect cause	
	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)
Worldwide	193,000	7.9% (4.7–13.2)	78,000	3.2% (1.8–5.5)	661,000	27.1% (19.9–36.2)	343,000	27.1% (19.9–36.2)	261,000	10.7% (5.9–18.6)	235,000	9.6% (6.5–14.3)	672,000	27.5% (19.7–37.5)
Developed regions	1100	7.5% (5.7–11.6)	2000	13.8% (10.1–22.0)	2400	16.3% (11.1–24.6)	1900	12.9% (10.0–16.8)	690	4.7% (2.4–11.1)	2900	20.0% (16.6–27.5)	3600	24.7% (19.5–33.9)
Developing regions	192,000	7.9% (4.7–13.2)	76,000	3.1% (1.7–5.4)	659,000	27.1% (19.9–36.4)	341,000	14.0% (11.1–17.4)	260,000	10.7% (5.9–18.7)	232,000	9.6% (6.4–14.3)	668	27.5% (19·7–37.6)

1. Data shown are the estimated proportion of cause of death (%) with 95% uncertainty interval (95% UI); 2. Revised from Say et al. [1].

Table 1. Distribution of causes of deaths by millennium development goal regions.

postabortion care. The provision of family planning policy is thus important in the women's reproductive care to reduce the morbidity and mortality.

2. Unintended pregnancy after the use of contraception

The term "family planning" has been used synonymously with contraceptive practice. In this review, we focus on interventions for failed contraceptive behavior or methods and address unsafe abortion as a preventable outcome.

2.1. Unintended pregnancy

Ineffective contraceptive use contributes to unintended pregnancy. In many Eastern European and South Asian countries, two-thirds of abortions are estimated due to contraceptive failure, mostly from traditional method use, and one-third are due to unmet need for contraception [2, 3]. In developed countries, it has been reported that most abortions occur as a result of contraceptive failure, and a small proportion are due to nonuse of contraception [5]. Based on the data of the National Survey of Family Growth in the United States, the overall failure rate for reversible methods declined from 12% in 2002 to 10% in 2006–2010. Long-acting reversible contraceptives (the IUD and the implant) had the lowest failure rates (1%) and oral pills with the modest failure rate (6%), while condoms and withdrawal carried the highest probabilities of failure (13% and 20%, respectively) [6].

Unintended pregnancies unnecessarily expose women to the risks associated with pregnancy, unsafe abortion, and childbirth, thereby contributing to maternal mortality and morbidity. It has been estimated that 250,000 maternal deaths could have been prevented by contraception and an additional 30% of maternal deaths avoided by fulfillment of the unmet need for contraception in 2008 [7]. A reduction in the number of unintended pregnancies is the greatest health benefit of contraception.

2.2. Impact of unsafe abortion

The World Health Organization defines unsafe abortion as "a procedure for terminating a pregnancy that is performed by an individual lacking the necessary skills, or in an environment that does not conform to minimal medical standards, or both" [4]. Unsafe abortions and abortion complications as well as the demand for postabortion care also vary remarkably by geographic region. In many low- and middle-income countries (LMIC), abortion is illegal or highly restricted, leading some women to seek unsafe abortions. About 7 million women are treated for complications from unsafe abortion procedures annually in LMICs [8]. Two studies indicate that at least 8% of maternal mortality is due to unsafe abortion and the contribution of abortion may be as high as 18% of these deaths [1, 9]. Factors that increase morbidity and mortality of unsafe abortion include lack of provider skill, poor technique, unsanitary conditions for performing the procedure, lack of appropriate equipment, use of toxic substances, poor maternal health, increasing gestational age, and lack of access to postabortion

care [10]. Prevention of unsafe abortion is crucial and requires a multipronged approach including improved access to and accessibility to safe abortion procedures and provision of high-quality postabortion medical care [9, 10].

3. Induced abortion

3.1. Option counseling and consent

Counseling women who seek abortions is an essential component of abortion care. Some women may be uncertain or lack of emotional support needed before making their decision [11–13]. It is essential to obtain a complete medical history before the procedure. The risk of providing a procedure in the setting of an uncontrolled medical condition should be weighed against the risk of delaying the procedure, since abortion complications increase with gestational age [14]. Dating of the pregnancy can be calculated by a last menstrual period that correlates with the uterine size on bimanual examination or by ultrasound. If the last menstrual period is discordant from the clinical examination, uterine fibroids are present, or if the physical examination is limited by obesity, ultrasound examination is useful to confirm gestational age. Ultrasonography can also help identify ectopic pregnancy or uterine anomalies before induced abortion.

3.2. Surgical versus medical for induced abortion

Medical and surgical methods are available for both first- and second-trimester abortions (**Table 2**). Medical abortion is generally chosen for early pregnancy, e.g., those less than 7 weeks of gestation. Vacuum aspiration is appropriate for women presenting between 7 and 14 weeks of gestation, although some doctors may offer medical abortion for pregnancy above 12 weeks. Three methods may be considered for second-trimester pregnancy termination: dilatation and evacuation, administration of systemic abortifacients, and intrauterine instillation of abortifacients [15].

To avoid anesthesia and surgery, some women prefer medical (drug-induced) abortion. However, medical abortion is associated with greater extent of pain, bleeding, and discomfort after the procedure, and more side effects in general than surgical abortion [14–16]. In

First trimester		Second trimester
Medical abortion	Combined mifepristone with prostaglandin regimens or prostaglandin-only regimens	Dilation and curettage (D&C)
Surgical abortion	Vacuum aspiration (manual or electric) Dilation and evacuation (D&C)	Administration of systemic abortifacients (e.g., mifepristone and prostaglandins) Intrauterine instillation of abortifacients (e.g., hypertonic saline, prostaglandin F2-alpha)

Table 2. Summary of methods of termination of pregnancy in the first and second trimesters.

comparison to surgical abortion, first-trimester medical abortion is more painful, less effective, less acceptable, and associated with more negative experiences and complications after the medications [17]. In the second trimester, surgical abortion is as effective as medical abortion [18].

A systematic literature review assessed the main reasons for women in early pregnancy to choose medical or surgical abortion [19]. Women opted for medical abortion because they thought the method being "more natural," wished to have abortion in one's home, and fear of complications. Women selecting surgical abortion viewed the process being quicker and safer, lesser pain, and bleeding. Women made decisions based mainly on rational information from professionals, also on emotions, and especially fears. Support techniques for an informed consent are especially needed [19].

3.3. Surgical termination

Surgical approach is the long-standing standard for safe induced abortion through either dilation and curettage (D&C) or vacuum aspiration (VA) [14]. Various methods of pain control for surgical abortion were used: paracervical block, oral medications (nonsteroidal anti-inflammatory drugs, anxiolytics, opiates) with cervical block, intravenous (IV) mild to moderate sedation, and general anesthesia. The most effective pain control during first-trimester abortion has not been proposed, but most women reported lesser pain when given IV sedation [20].

3.3.1. Dilation and curettage (D&C)

Cervical dilation is generally needed before surgical intervention. Cervical dilation is generally needed before surgical curettage. As a general rule, the cervix is dilated to the width in millimeter equal to the gestational age in weeks. For example, the cervix is dilated to 7 mm for a 7-week gestation. Serial Hegar's dilators were inserted until an appropriately sized curette can be introduced safely without a force to avoid cervix laceration (which would create a false passage into the cervix and risk excessive bleeding and severe uterine perforation). The curette is then used to gently scrape the uterine wall and remove the tissue in the uterus, which is examined to ensure the procedure is complete.

If there is difficulty with dilation, try slowly twisting the dilator to find the pathway through the cervix. An OS Finder or uterine sound can also be used for this purpose. The cervical canal and uterus can also be visualized with ultrasound guidance, allowing direct visualization of the dilator in the cervix. Cervical ripening agents, such as osmotic dilators or misoprostol, can help soften the cervix and ease dilation. For early gestations when dilation is difficult, consider delaying the procedure for cervical preparation or offering a medical abortion instead.

3.3.2. Vacuum aspiration (VA)

Instead of sharp curettage, first-trimester surgical abortion can be performed by using suction to remove retained products of conception through the cervix. Manual vacuum aspiration

(MVA) uses a manual vacuum syringe and cannula, and electric vacuum aspiration (EVA) uses an electric pump. In both methods, the pump mechanism creates a vacuum that empties the uterus. Although there are no clear gestational age limits for MVA use, most providers will use it up until 8 to 10 weeks of gestation because it may need to be emptied multiple times during a procedure. The EVA machine should be powered on to create suction after the cannula is inserted into the uterus [14].

For patients with a tortuous or angulated cervix/uterus, consider ultrasound guidance to minimize the risk of perforation. If there is difficulty in placing the cannula after dilation because of curvature of the cervix/uterus, a sterile sound may be placed, and the cannula is inserted over the sound. The sound is then removed, and the vacuum aspirator is attached.

In 2010, a Cochrane review found that VA was safer, quicker, and less painful than sharp metal curettage and also led to less blood loss. However, they were similar in the incidence of sepsis post procedure, uterine perforation, or the need for re-evacuation [21]. MVA and EVA do not appear to differ substantially in efficacy [22]. VA can be performed in the absence of a fully equipped facility and at secondary health facilities, with or without electricity, and without the capacity for general anesthesia. It is suitable for low-income settings because it is more accessible and reduces the consequences of blood loss and worsening infection associated with transportation to tertiary health facilities [22].

3.3.3. Complications and management

First-trimester abortion is safe with 0.6 deaths per 100,000 abortions, while childbirth has 14 times the risk, with 8.8 deaths per 100,000 live births [23]. Overall, less than 1% of women have major complications, and only <0.5% of women will have complications requiring hospitalization [23]. Nonetheless, alertness for complications and subsequent timely management are essential in providing safe abortions. There is a wide variation across studies in the definition of complications that required interventions [24]. The following complications were mostly reported in the literatures.

3.3.3.1. Hemorrhage

Hemorrhage as excessive bleeding requiring transfusion, hospital admission, or greater than 500 mL of blood loss occurs in less than 1% of terminations [25]. Hysterectomy for severe hemorrhage is performed in 1.4 per 10,000 abortions of any gestational age. The risk factors for hemorrhage are provider inexperience, increasing gestational age, advanced maternal age, increased parity, prior cesarean section or uterine scar, fibroids, and a history of obstetric hemorrhage and gestational age. The causes of hemorrhage include atony, abnormal placentation, cervical laceration, perforation, coagulopathy, and retained products of conception. Oxytocin given routinely during a first-trimester abortion does not decrease blood loss [25].

3.3.3.2. Cervical lacerations

The incidence of cervical laceration is approximately 2 per 1000 procedures [26]. Risk factors for cervical laceration are nulliparity, surgical inexperience, and inadequate dilation. Bleeding from cervical lacerations can be managed with direct pressure or cautery to the bleeding site and

suturing in cases with large laceration. If there is excessive bleeding or bleeding that continues despite repair, one should be concerned for a high laceration with possible uterine artery involvement. High lacerations may require repair by laparotomy or laparoscopy. An important long-term consequence of cervical injury during dilation and curettage is cervical incompetence leading to subsequent late miscarriage, premature rupture of the membranes, or preterm birth [14, 16, 24].

3.3.3.3. Uterine perforation

Uterine perforation occurs in approximately 0.1–3.0 in 1000 procedures [26]. Perforations generally occur at the fundus and are more likely to cause complications if they occur after the first trimester. The instrument penetrates the uterus most likely the suction cannula, followed by a dilator and then a curette [27]. Instruments passing further than expected with little resistance or loss of a gritty sensation may suggest perforation. If a perforation is suspected and there is minimal blood loss and no concern for bowel involvement, patients can be monitored for 2–4 h in the clinic. Patients with perforations with hemorrhage, concern for bowel involvement, or injury to other surrounding structures should be transferred to the hospital for laparoscopy or laparotomy [25].

3.3.3.4. Incomplete abortion

The clinical presentation of retained products of conception (RPOC) may include irregular uterine bleeding, pelvic pain, uterine tenderness, and fever. The ultrasound findings indicative of RPOC are a hyperechoic endometrial thickness combined with abundant low-resistance flow in the myometrium or just beneath the endometrium. Using ultrasound for diagnosis of RPOC can be challenging because the ultrasound findings of asymptomatic and symptomatic women can be quite similar after abortion [28].

Repeat curettage, suction evacuation, removal by clamp ring, or hysteroscopic resection can be employed [29]. Hysteroscopic excision allows the retained placental products to be excised under direct vision and possibly leads to fewer uterine adhesions and incomplete evacuation [29]. Women preferring to avoid surgical intervention can be treated with misoprostol in order to induce uterine contractions. Complete evacuation rates after taking misoprostol were varied in different routes of administration or doses or both [30]. Though there is insufficient evidence to draw firm conclusion, combination of progesterone receptor modulator mifepristone with misoprostol could improve the evacuation rate [31].

3.3.3.5. Infections

Postabortion infections occur in less than 1% of procedures and are decreased with preoperative doxycycline prophylaxis [32]. Infections usually occur days after the procedure is usually diagnosed in the presence of fever, pain, pelvic tenderness, and leukocytosis. Women should be evaluated for possible RPOC and re-aspirated if necessary. Without prompt treatment, the infection can spread to the uterus and pelvis. Further spread may lead to systemic infection presenting as bacteremia, sepsis, or septic shock [33]. The organisms involved are usually common vaginal bacteria. However, clinicians should be alert to potentially lethal infection by bacteria that produce toxins, such as *Staphylococcus aureus*, that may be resistant to some

penicillin: *Clostridium perfringens* and *Clostridium sordellii*; group A streptococcus; and also some toxin-producing strains of *E. coli* [32, 33].

3.3.3.6. Anesthesia and late complications

In addition to the complications of anesthesia or intravenous sedation, D&C may result in adhesions (Asherman's syndrome). Intrauterine adhesion increases the risks of future ectopic pregnancy, miscarriage, or abnormal placentation (placenta previa and accreta) [34]. The risk of preterm birth after induced abortion is higher than that in a first pregnancy or after a previous live birth. Surgical but not medical abortion appears to be associated with an increased risk of spontaneous preterm birth [34]. These data warrant caution in the use of surgical uterine evacuation and should encourage safer surgical techniques as well as medical methods [34, 35].

3.4. Medical termination

Whenever surgical abortion is difficult or unacceptable, medication abortion should be considered. Mifepristone (RU 486) is a 19-norsteroid that specifically blocks receptors for progesterone and glucosteroids. Acting as a competitive inhibitor of the progesterone receptor, mifepristone is used as a pretreatment 24–48 h before inducing first-trimester abortion with a prostaglandin analog. Misoprostol, a synthetic prostaglandin E1 analog, has been proven effective for pregnancy termination at various gestational ages, cervical ripening, labor induction in term pregnancies, and incomplete abortion treatment. The combination of a mifepristone and a prostaglandin derivative was the most effective regimen for medical pregnancy termination [36].

Mifepristone is approved by FDA for medical abortion up to 49 days of estimated gestational age. However, mifepristone is commonly used in combination with vaginal or buccal misoprostol at higher gestational ages based on studies demonstrating safety and efficacy up to 9 weeks [36]. Recent data support the use of mifepristone for outpatient abortion through 70 days of gestation, since similar safety and effectiveness as those used at 63 days of gestation have been demonstrated [37]. Mifepristone and misoprostol may also be used from 10 to 13 weeks [39]. This will require a setting whereby patients' condition can be monitored and a repeated dose of misoprostol administered given the potential risk of excessive bleeding at this later gestational age. Depending on the local regulations, the candidate setting could be a labor and delivery unit or gynecology inpatient department [37–39].

The combined use of mifepristone and misoprostol for second-trimester termination has a shorter induction time and lower misoprostol dose compared with misoprostol alone [39]. Both sublingual and vaginal routes of misoprostol administration resulted in a shorter abortion duration than the oral route [40]. The differences in duration or side effects between sublingual and vaginal routes of misoprostol administration were not significant. However, sublingual administration may be preferred by patients over vaginal administration due to ease of use [39].

It is effective and feasible to prevent unintended pregnancy with low-dose mifepristone combined with misoprostol before expected menstruation or menstruation regulation after missed period. The success rate of abortion for mifepristone-misoprostol regimen is 95–98%. [41], while 78–90% for misoprostol only [42]. Despite highly restrictive abortion laws in LAC, access

to safer abortion increased. Significant barriers still exist; thus, it is necessary to enhance the use of modern contraceptive and safer abortion methods among women in the region [43, 44].

4. Postabortion care

Postabortion care is part of the reproductive health care in women after induced abortions. Extreme urgent demand in LMICs is understandable given that, in most of them, induced abortion is either completely illegal or legal but with limited access by women who need it. In such settings, the only option for women wishing to end their pregnancies is to procure clandestine, usually unsafe abortions—with substantial negative consequences for themselves, their families, and their societies [44]. It has been shown that comprehensive family planning would reduce unintended pregnancies and therefore the incidence of unsafe abortions [45].

All women seeking an abortion should be offered a contraceptive method. Long-acting reversible contraceptives, such as the intrauterine device (IUD), the progestin implant or the progestin injection (depot medroxyprogesterone acetate or DMPA), have been found to statistically significantly decrease abortion incidence [46]. IUDs placed immediately after an abortion lower the rate of repeat abortions from 34.6 per 1000 woman-years to 91.3 per 1000 woman-years in controls [47]. Immediate postabortal IUDs are safe and effective, although they have a slightly higher expulsion, ranging from 3 to 5% immediately after an abortion compared with 0–2.7% in interval groups [48]. However, at 6 months postabortion, IUD use is higher following immediate insertion compared to delayed insertion [49]. Women interested in progestin or combined hormonal contraceptives can be given a prescription before leaving the clinic to be started immediately after the procedure [50].

5. Conclusions

Surgical methods for abortion are effective and more cost-effective than medical management, particularly in LMICs where access to medical interventions might be limited. They are associated with fewer side effects such as pain and bleeding—a critical advantage in LMICs, where health facilities might be distant and transportation difficult.

Access to VA and D&C should be increased by training more health workers and investing in surgical equipment in secondary health-care settings. Although surgical management of incomplete abortion predominates where such services are available in LMICs, increased access should be a priority to improve postabortion care and reduce abortion-related morbidity and mortality. Medical abortion is an effective, safe, private pregnancy termination. It should be provided as a personal choice for use.

Supporting patients to identify high-quality decision aids and facilitating nonspecialist developers' adoption of best practices are needed. Increased investment in family planning will help satisfy the large unmet need for contraception by reducing the number of unintended pregnancies and dramatically lower maternal mortality and morbidity as well as the number of unsafe abortions.

Author details

Li-Wei Chien[1,2]* and Heng-Kien Au[1,2]

*Address all correspondence to: chienwei@tmu.edu.tw

1 Department of Obstetrics and Gynecology, School of Medicine, Taipei Medical University, Taipei, Taiwan

2 Department of Obstetrics and Gynecology, Taipei Medical University Hospital, Taipei, Taiwan

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